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September 1966

EVALUATIONS OF SOVIET
SURFACE-TO-SURFACE
MISSILE DEPLOYMENT
24TH REVISION

A Report of the Deployment Working Group
of the
Guided Missile and Astronautics Intelligence Committee



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The Guided Missile and Astronautics Intelligence Committee (GMAIC) wishes to express its appreciation to the National Photographic Interpretation Center for its assistance in the editing, illustration, and publication of this report.

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DEPLOYMENT WORKING GROUP

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Photographic Interpreter support is provided by the Photographic Analysis Group, NPIC.

NOTE: All correspondence relative to this report should be directed to the Chairman, Guided Missile and Astronautics Intelligence Committee (GMAIC).

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PREFACE

This report, published bimonthly by the GMAIC Deployment Working Group (DWG), provides a comprehensive, ready-reference listing of all ICBM, IRBM, and MRBM deployment locations, types of site configurations, photographic references, estimated construction and operational status, and other evaluations by the DWG. These data constitute the majority view of the DWG membership, and may not correspond precisely to individual assessments by each member. Additional data may be added to future revisions.

Dissemination of the report was previously limited to holders of the DWG report, Soviet Surface-to-Surface Missile Deployment. Because the information contained herein is both supplemental and self-sustaining, distribution will no longer be limited to holders of the above report.

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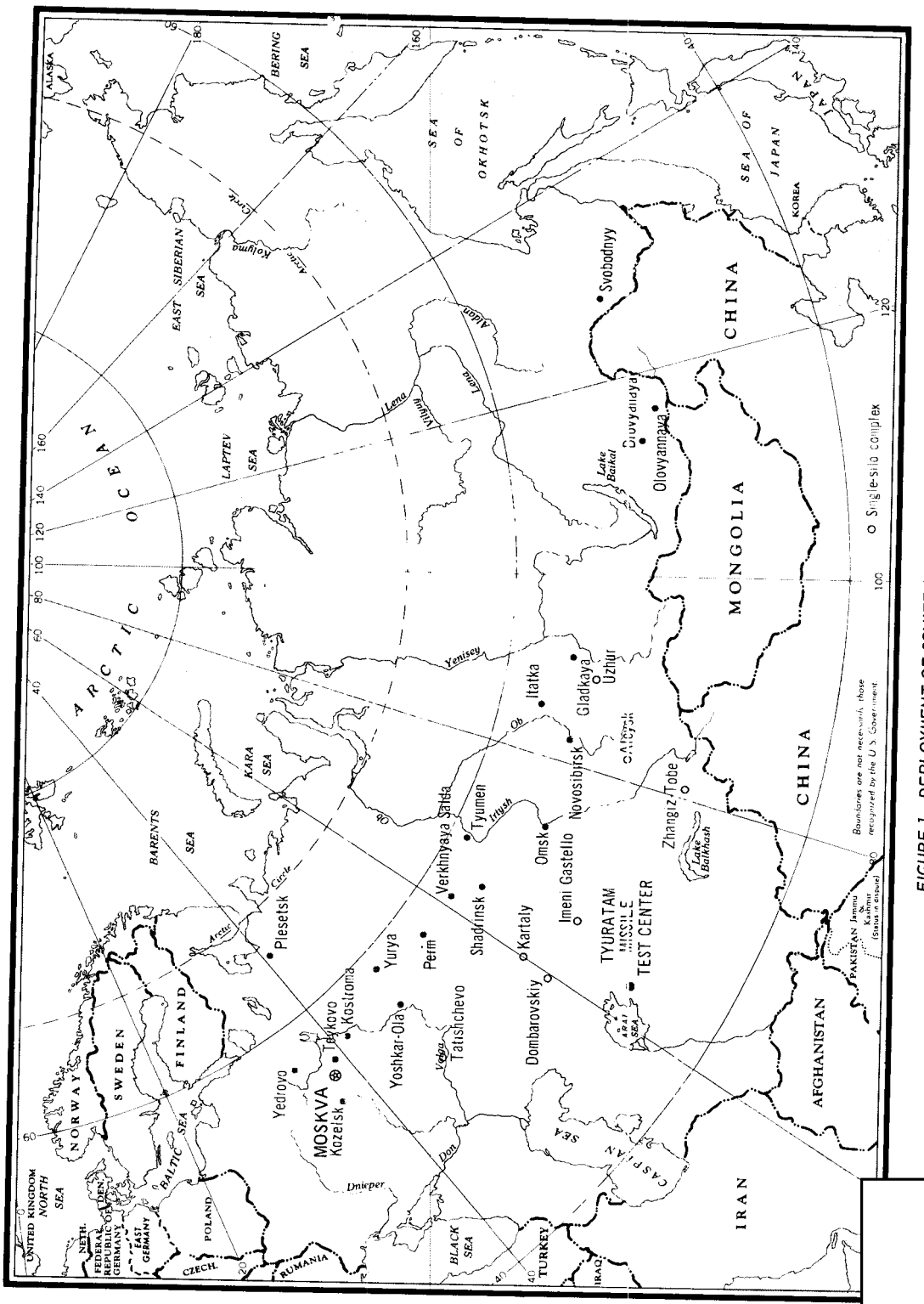


FIGURE 1. DEPLOYMENT OF SOVIET ICBM COMPLEXES.

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INTRODUCTION

This report is the 24th Revision of Evaluations of Soviet Surface-to-Surface Missile Deployment prepared by the Deployment Working Group (DWG) of the Guided Missile and Astronautics Intelligence Committee (GMAIC). The information contained in this and previous revisions is self-sustaining and supplements the basic DWG report Soviet Surface-to-Surface Missile Deployment which provides detailed information on individual launch facilities of the Soviet Strategic Rocket Forces. The basic report, dated 1 January 1962 (Control Number [redacted]), has been revised and updated on a periodic basis. Further updating is accomplished in reports prepared and published for GMAIC by the National Photographic Interpretation Center (NPIC).

This 24th Revision covers the period from [redacted]

[redacted] and continuing analysis of previous missions and other sources have provided additional information on the Soviet strategic missile deployment program. A summary of estimated status of identified ICBM, IRBM, and MRBM launchers at deployed complexes is given in Table 1. The other tables normally included in this report are being modified and will be published in the next Revision. Cutoff date for information in this report is [redacted]

We have completed our periodic in-depth review and analysis of the entire Soviet ICBM, IRBM, and MRBM deployment programs, including evidence relating to the status of currently operational strategic missile systems, the pace and extent of current deployment, construction timing and deployment pattern, and operational

control. The results of this review and analysis are included in this report.

SOVIET ICBM DEPLOYMENT

GENERAL

Significant trends in the Soviet ICBM deployment program at this time include: (1) continued deployment of Type IIC single-silos at the 6 complexes originally identified, but at a slightly increased pace to that observed in [redacted] (2) continued deployment of Type IID single-silos at the 5 complexes originally associated with these sites; (3) detection of Type IID single-silo deployment in 1966 at 4 additional complexes; 3 SS-7 complexes and 1 SS-8 complex; (4) an increase in the pace of construction starts of Type IID silos; (5) a construction time for Type IID silos that is slower than we had previously estimated; and (6) achievement of operational status of significant numbers of both Type IIC and Type IID single-silos.

CURRENT DEPLOYMENT

The number of identified ICBM complexes remains at 25. See Figure 1 for location of deployed ICBM complexes. These complexes now contain a total of 668 confirmed and probable launchers, of which 150 are soft and 518 are hard. This represents an increase of 144 launchers over the number reported in our 23rd Revision. Included in the hard launcher count are 440 single-silos in various stages of construction. We are carrying 31 single-silo sites in the possible category which are not included in the total launcher count.

Of the 668 confirmed and probable launchers, 297 are estimated to be operational, including 151 in a hard configuration. We believe that 47 of the 55 launchers at Tyuratam are now completed and, although not normally considered as part of the operational ICBM force, they could

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be employed in an operational role should the Soviets so desire. The ICBM sites have been designated by type, as shown and explained in Figure 2.

Evaluation of all evidence received since our last revision has resulted in the following additions or changes at the complexes indicated:

ALEYSK, 4 Type IIIC sites newly identified
DOMBAROVSKIY, 3 Type IIIC sites newly identified; 2 possible sites confirmed
IMENI GASTELLO, 3 Type IIIC sites newly identified

KARTALY, 2 Type IIIC sites newly identified
ZHANGIZ-TOBE, 3 Type IIIC sites newly identified; 1 possible site confirmed
DROVYANAYA, 17 Type IIID sites newly identified

KOSTROMA, Type IIID deployment (4 sites) newly identified

KOZELSK, 16 Type IIID sites newly identified

OLOVYANNAYA, 23 Type IIID sites newly identified

PERM, 11 Type IIID sites newly identified
SVOBODNYY, 13 Type IIID sites newly identified

TATISHCHEVO, 31 Type IIID sites newly identified

YEDROVO, 6 Type IIID sites newly identified.

In addition, several Type IIID sites at various complexes were upgraded from possible to confirmed or probable sites.

STATUS OF FIRST AND SECOND GENERATION DEPLOYMENT

Although strong Soviet emphasis has been placed on ICBM development, not all R&D programs have produced widely deployed weapon systems. Soviet ICBM deployment commenced with the first generation SS-6. Deployment of this system probably began in 1959 and resulted in the construction of only 4 launchers at

Plesetsk, the oldest operational ICBM complex. Continuing photographic coverage of the 4 SS-6 launchers at Plesetsk indicates that this system is still operational and there is no evidence which we can relate to retrofit of these launchers to a follow-on system.

In the 1961-1963 period, the SS-7 and SS-8 ICBMs were deployed. Most likely the planned SS-8 deployment was curtailed and, to date, only 23 deployed launchers (14 soft and 9 hard) have been associated with this missile. These sites are all operational and we have detected no activity indicative of a retrofit with another system; there has been no indication of a phase-out of these sites. Total deployment of site configurations associated with the SS-7 consists of 128 soft launchers and 69 hard launchers, all of which are operational. We are still unable to determine whether the SS-7 or SS-9 missile system is deployed in a later group of 27 Type IIIA hard launchers, but we continue to believe that the SS-9 is the most likely possibility. There has been no evidence of change or modification suggestive of retrofit of the SS-7 sites, nor has there been any indication of phase-out of these older sites.

A halt was observed in ICBM deployment,

During that period no ICBM launch site construction starts were identified. In fact, since no construction starts of any of the previously observed first and second generation ICBM launch sites have been observed. Instead, deployment began during early 1964 of 2 new configurations now designated as Type IIIC and IIID single-silo launch sites. This indicates that, probably in mid-1963, the Soviets made a decision to extend future ICBM deployment to hardened and well-dispersed silo launchers. To date, the only exception to this evaluation is the 4 soft launchers (Sites 9 and 10) at Plesetsk.

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SINGLE-SILO DEPLOYMENT

We have now identified 471 Type IIIC and IIID single-silo launch sites, of which 31 are still being carried in the possible category. Deployment of Type IIIC sites is continuing at the 6 complexes originally discovered in [] Type IIID deployment now involves 8 of the older complexes and the 1 complex newly identified in [] Significant numbers of both types of single-silos are now considered to be operational.

Type IIIC Sites

GENERAL

Confirmed Type IIIC single-silo site deployment continues to be limited to the Aleysk, Dombarovskiy, Imeni Gastello, Kartaly, Uzhur, and Zhangiz-Tobe complexes identified in [] These complexes now contain a total of 122 confirmed and probable sites, ranging in construction stages from early to complete and operational.* In addition, we are carrying 2 sites in the possible category, 1 at Dombarovskiy, and 1 at Uzhur.

DEPLOYMENT

Since our last evaluation, the construction of Type IIIC sites has continued at a slightly increased pace. The Uzhur Complex now contains the largest number of identified Type IIIC sites (22), while the Aleysk Complex continues to lag behind the rest of the complexes and contains the smallest number of sites (15). Dombarovskiy now has 24 sites, Imeni Gastello 21, Kartaly 18, and Zhangiz-Tobe 17. Based upon the site construction starts identified since the beginning of

*To clarify the terms used in referring to construction stages at single-silo sites, identifiable steps in the construction process have been categorized as follows: early stage, clearing and grading, open-cut silo excavations, silo coring; midstage, silo under construction, silo backfilling; late stage, silo door installed, final backfill and grading; complete, final configuration apparent; operational, equipment installed and checked out (estimated).

the Type IIIC program, we believe this to be a well-planned and implemented deployment program consisting of about 5 construction starts per month. We believe that 33 of the Type IIIC sites are now complete and operational (Figure 3).

Initial indications were that the Type IIIC sites would be operationally deployed and controlled in groups of 3, i.e., 1 control facility and associated electronic facility controlling 3 launch sites. We now believe that the deployment pattern is a 1 by 6 configuration. This judgment is based partly on the prototype IIIC deployment at Launch Group I, Tyuratam, but essentially on the pattern observed at the deployed complexes and the numbers of control and electronic facilities associated with the deployed sites. The following table depicts site deployment by complex, and the associated control and electronic facilities:

Complex	No of Sites	Control Facility	Electronic Facility
Aleysk	15	2	2
Dombarovskiy	24	4	3
(+ 1 Possible)			
Imeni Gastello	21	3	3
Kartaly	22	3	3
Uzhur	22	4	3
(+ 1 Possible)			
Zhangiz-Tobe	18	3	3
	122	19	17
(+ 2 Possible)			

At the Uzhur Complex, which contains 22 confirmed and probable (and 1 possible) sites, we have identified 4 control facilities and 3 electronic facilities. An electronic facility is usually constructed late in the site development cycle, and we anticipate that another L-shaped electronic facility will appear at the fourth identified control building and that at least 2 more sites will be deployed at this complex.

As in the case of earlier deployment, all complexes will not necessarily contain the same number of sites but we do expect the 1 by 6

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pattern to persist at all Type IIIC complexes. We would expect 5 of these complexes to consist of at least 4 groups of 6 sites each. If there is a step-up in deployment at the Aleysk Complex, it could also reach this level.

CONTROL

It appears that individual sites within each group of 6 will be connected by cabling to the control facility. At the Uzhur Complex, Launch Sites 1 through 6 are now complete and considered to be operational. Within this group of 6 launchers, Launch Site 2 has a control facility and an L-shaped electronic facility and there is ground scarring, presumably for cabling, connecting the control facility at Site 2 and the other silos in the group.

However, we now have tenuous evidence of cabling connecting the various groups, and running from the control facility in one group to the control facility of another group. It would be operationally beneficial to have redundancy in control but we are not at this time able to confirm or deny that such redundancy exists in the IIIC deployment program.

SITE COMPOSITION AND CONSTRUCTION TIMING

All Type IIIC single silos appear to be identical, or very similar, so that the construction techniques and details observed at 1 site can be extended to the others. These sites are built within an open excavation and completely backfilled on completion so that only the tops are visible. The major components of a completed site are the circular launch silo, the square outer structure, the exhaust system, and the silo door.

A security fence usually is erected around the prospective site; support buildings are constructed; and earth-moving equipment begins surface grading. Next a silo excavation 20 to 30 feet deep is visible, with 1 or 2 earthen ramps providing access into the excavation. The spoil

from this excavation is utilized in forming a large rectangular pattern at the side of the excavation and a square pattern, in line with the rectangular pattern, on the opposite side of the excavation. Once the desired depth is reached, silo coring begins. This, essentially, completes what we refer to as the early stage of site construction (Figure 4) and involves a mean construction time of 5 months.

The silo is cored and construction progresses up to the level of the excavation floor. In the next visible step, a concrete foundation for the base of the silo structure is poured in the square at the bottom of the excavation and construction begins on the silo headworks. The silo and the 65-foot-square headworks are then constructed simultaneously up to ground level. The headworks is compartmented, and probably houses ducting for the exhaust system and other required silo equipment. When ground level is reached, some backfilling occurs. This completes the midstage of construction (Figures 5 and 6) and involves a mean time of 10 months and a cumulative mean time of 15 months from the start of construction.

The entire site is then backfilled. At about this time, the 60- by 30-foot silo door is constructed on site. This door protects the silo aperture, which is about 15 feet in diameter, and the exhaust ducts. This late stage of construction (Figure 7) encompasses about 6 months and the overall cumulative mean construction time for the site is 21 months.

Although Type IIIC launch site construction time averages about 21 months from start to completion, we allow approximately 90 days in addition for outfitting the silo, installing the missile, and component checkouts before entering the site into the Soviet operational ICBM inventory (Figure 8). We do believe, however, that the Soviets could complete these sites in a shorter time period if they so desire.

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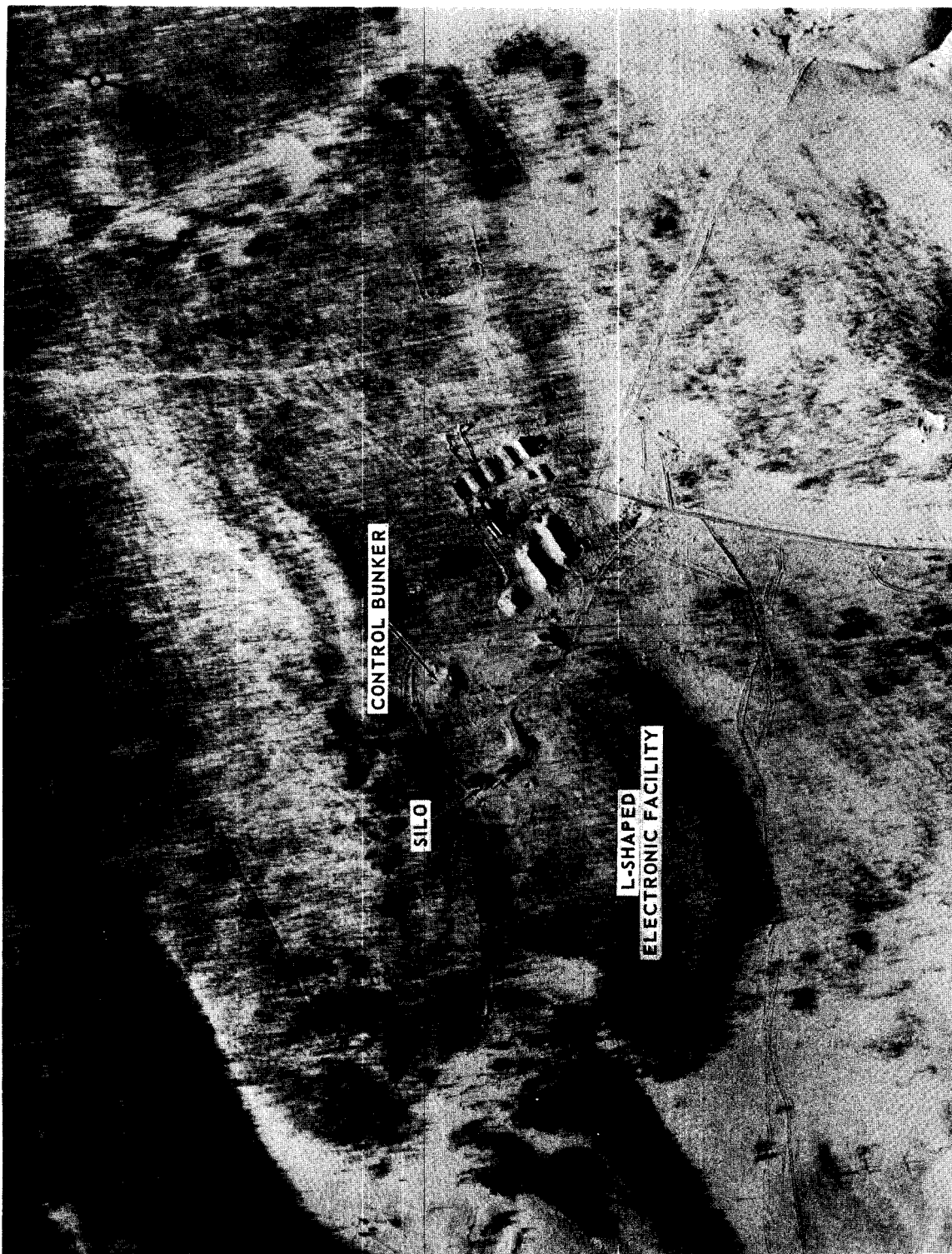


FIGURE 3. COMPLETED TYPE IIIC SITE, WITH CONTROL FACILITY.

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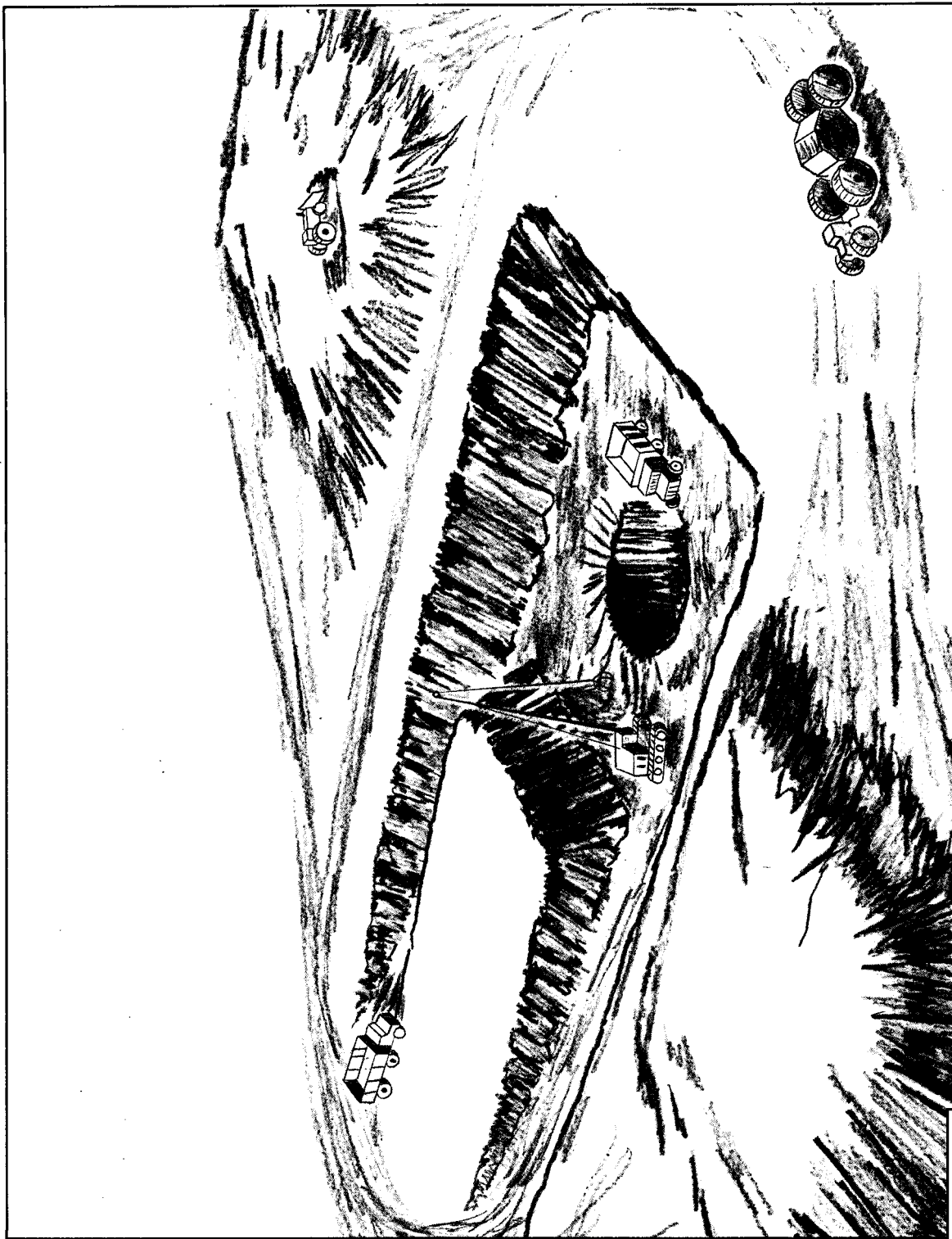


FIGURE 4. ARTIST'S CONCEPT OF TYPE IIIC SITE IN EARLY STAGE OF CONSTRUCTION.

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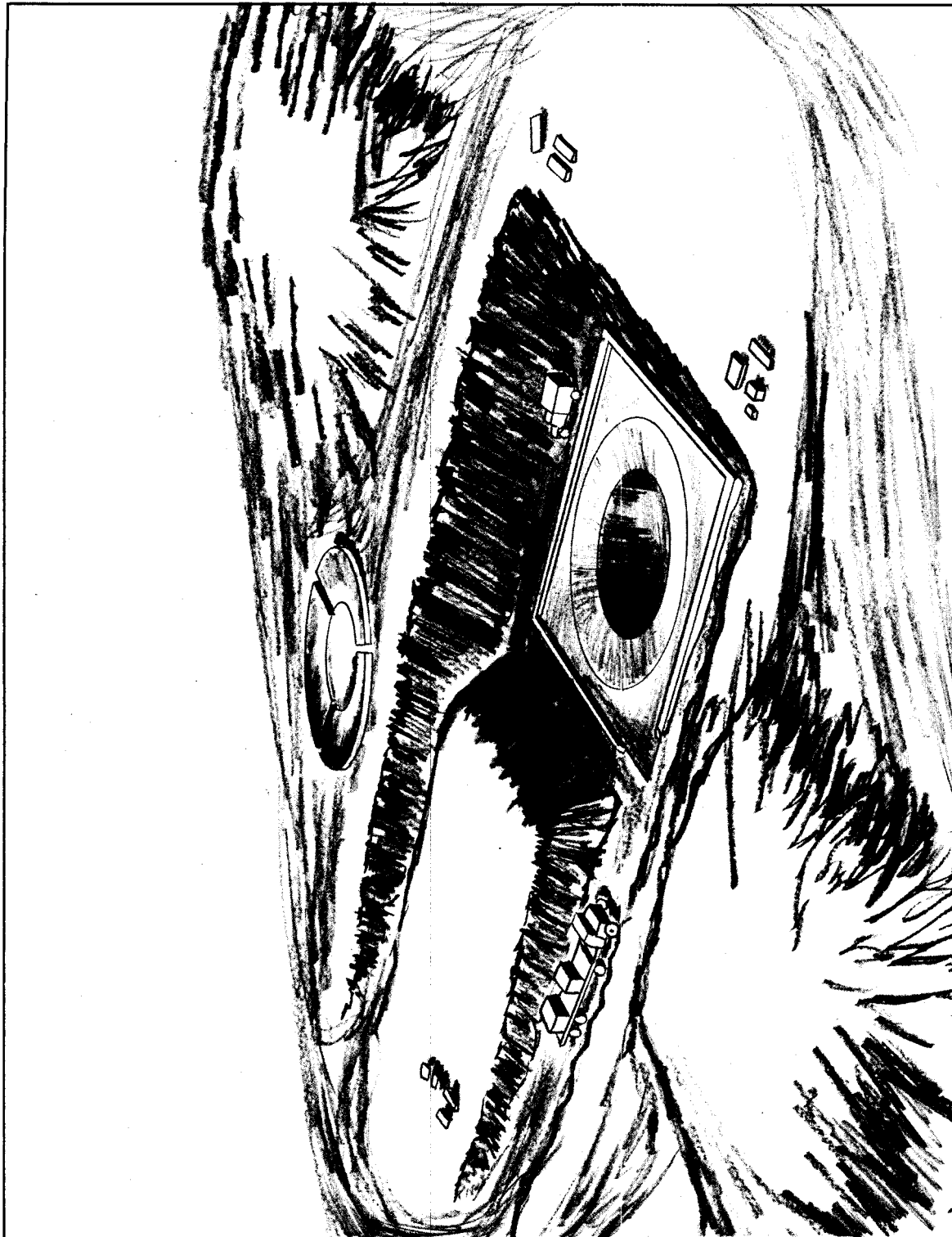


FIGURE 5. ARTIST'S CONCEPT OF TYPE IIIC SITE IN MIDSTAGE OF CONSTRUCTION.

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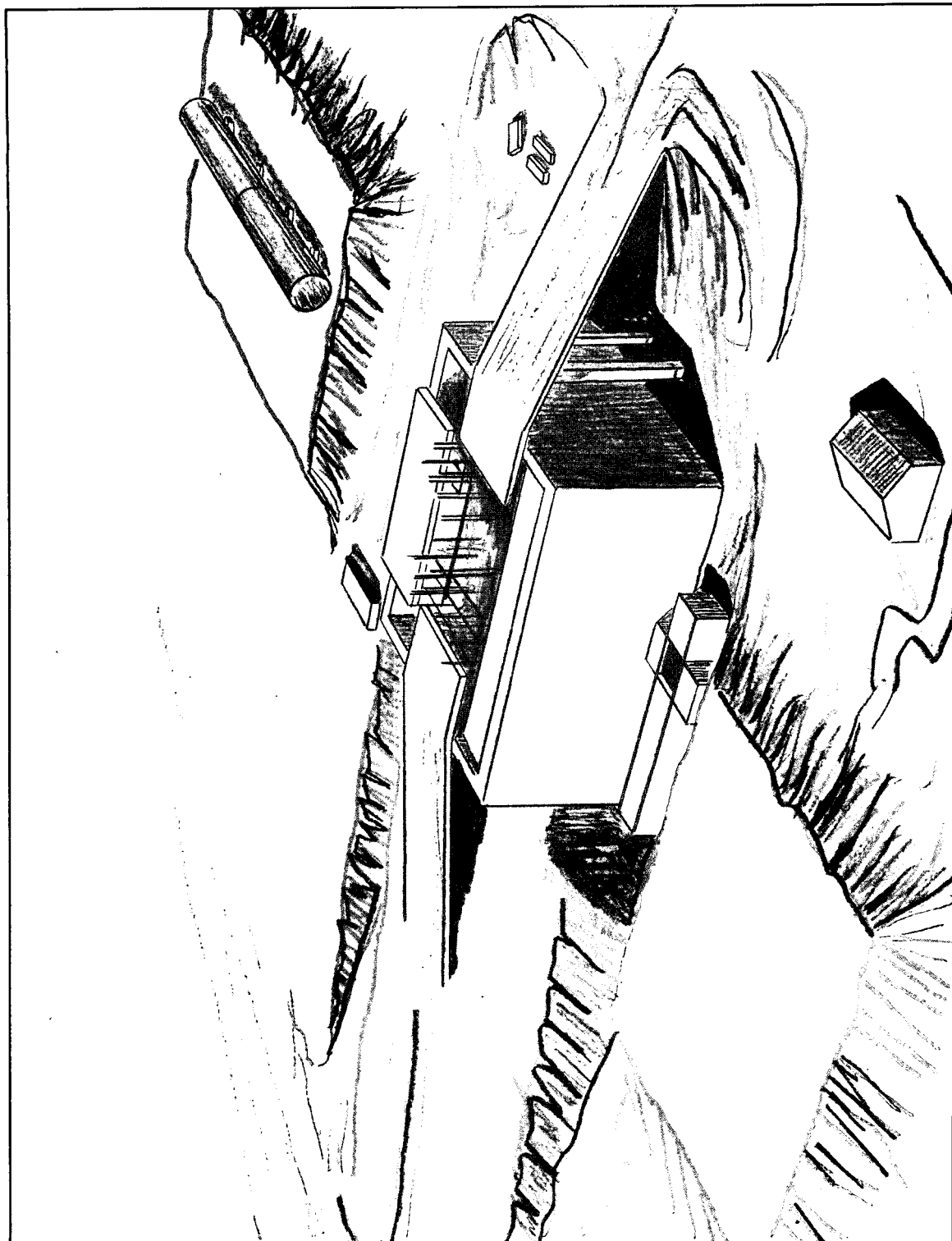


FIGURE 6. ARTIST'S CONCEPT OF TYPE IIIC SITE MIDSTAGE (LATE) OF CONSTRUCTION.

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FIGURE 7. ARTIST'S CONCEPT OF TYPE IIIC SITE IN LATE STAGE OF CONSTRUCTION.

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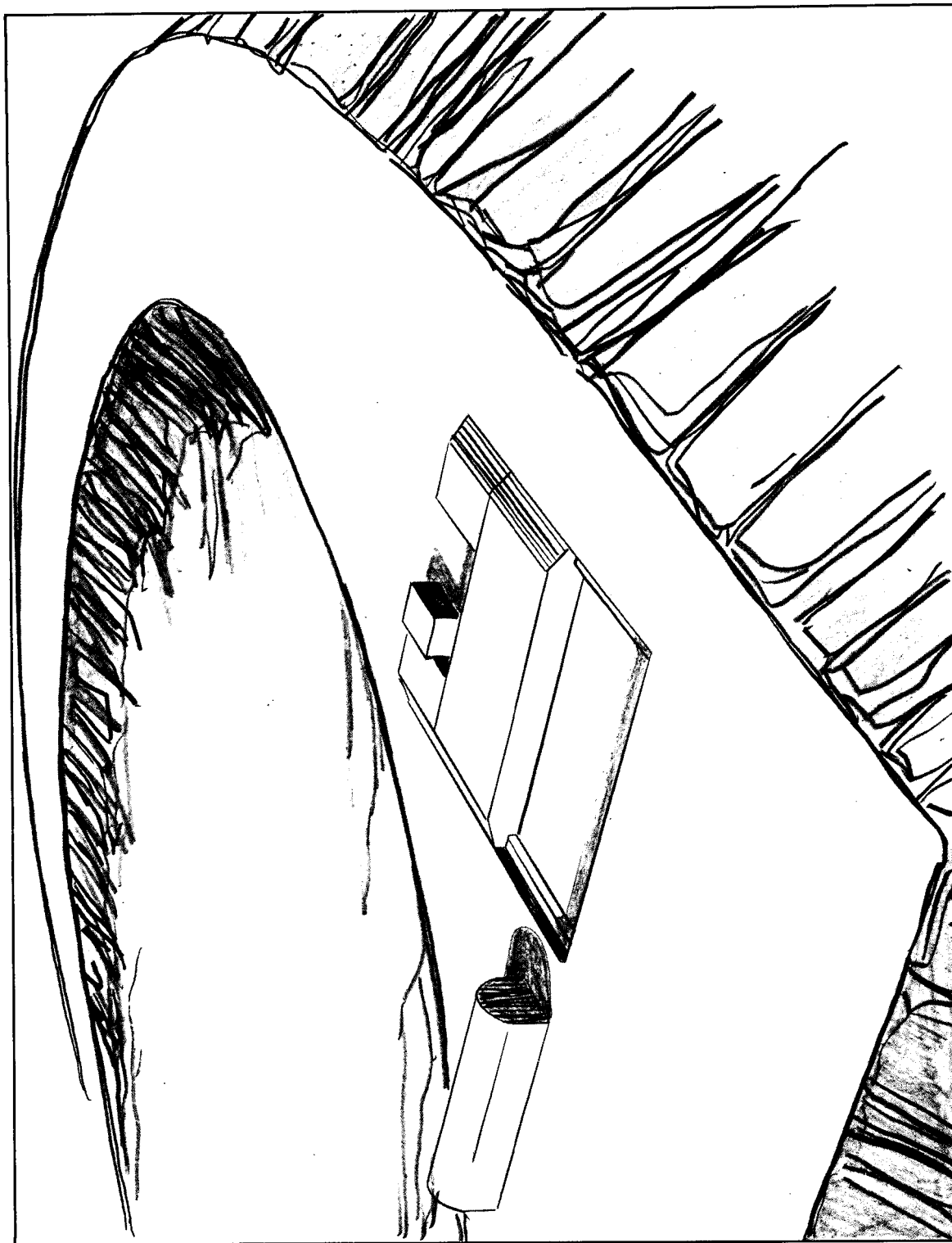


FIGURE 8. ARTIST'S CONCEPT OF COMPLETED TYPE IIIC SITE.

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PACE AND EXTENT

The pace of deployment has remained fairly constant since the start of the Type IIIC program. We do not believe that there are any undetected Type IIIC complexes. The pace for the first 21 months of the program averaged about 3.5 starts per month. Beginning with the last quarter of [] a slight increase in pace was noted which has carried over into []. During this period 47 Type IIIC sites were started and the pace was about 5.2 starts per month. Our estimate for the current pace of construction starts is about 5 per month.

SUPPORT FACILITIES

The complex support facilities at all 6 Type IIIC complexes (Figure 9) appear to have no significant dissimilarities. They consist of components to serve such basic functions as housing, administration, warehousing (receiving and storage), and open storage. Although the physical layout of these components varies from complex to complex, the functions are basically the same. Typically, there is 1 very large building at the railhead and storage area, apparently a transloading (possible storage) warehouse.

The rail-to-road transfer points at all Type IIIC (large single-silo) ICBM complexes are nearly identical, with the same basic arrangement and types of buildings evident. []

Type IIID Sites**GENERAL**

We have identified a total of 318 confirmed and probable, and 29 possible, Type IIID single-silo launch sites at 1 newer (Tatishchevo) and 8 of the older ICBM complexes (Drovyannaya, Gladkaya, Kostroma, Kozelsk, Olovyannaya, Perm, Svobodnyy and Yedrovo). We believe that 40 of these sites are now operational.

Earliest construction of the Type IIID configuration began at the Tatishchevo Complex in about []. Initial deployment followed at Perm in [], Olovyannaya and Gladkaya about [], and at Drovyannaya in about []. The discovery, in [] of Type IIID deployment at Kozelsk, an older SS-8 complex, and at Svobodnyy, Yedrovo, and Kostroma, SS-7 complexes, is the most significant deployment development since our last overall evaluation. These discoveries, along with the large number of additional Type IIID single silos identified at the 5 complexes where they were deployed initially, indicate that this program has regained momentum and discount the estimate made last year that there was a slowdown in the pace of deployment of these sites.

DEPLOYMENT

No discernible pattern has yet evolved which would permit determination of the ultimate numerical configuration of a typical Type IIID complex. At the 5 complexes where Type IIID deployment was identified in [] there is a

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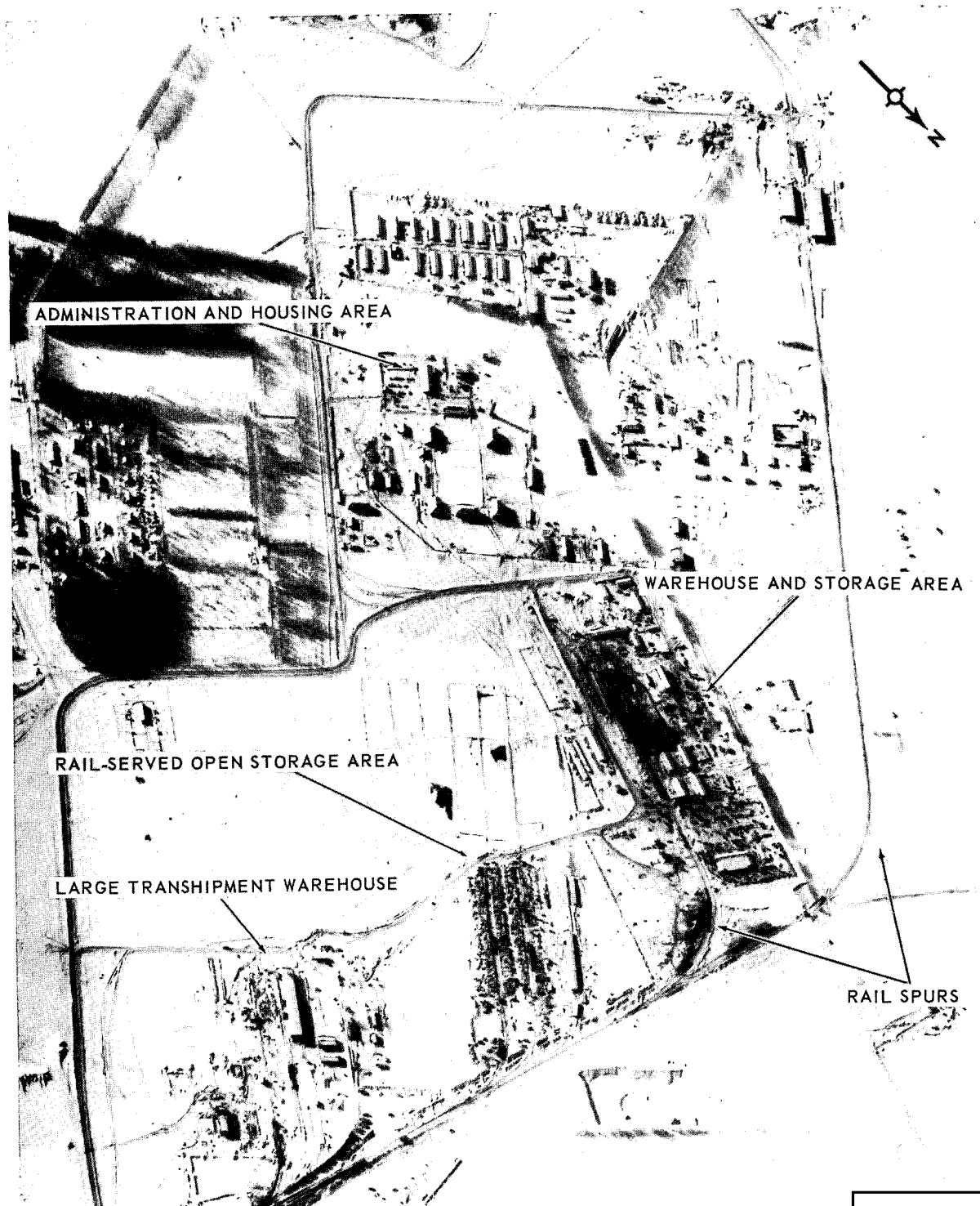


FIGURE 9. COMPLEX SUPPORT FACILITY SERVING TYPE IIIC SITES.

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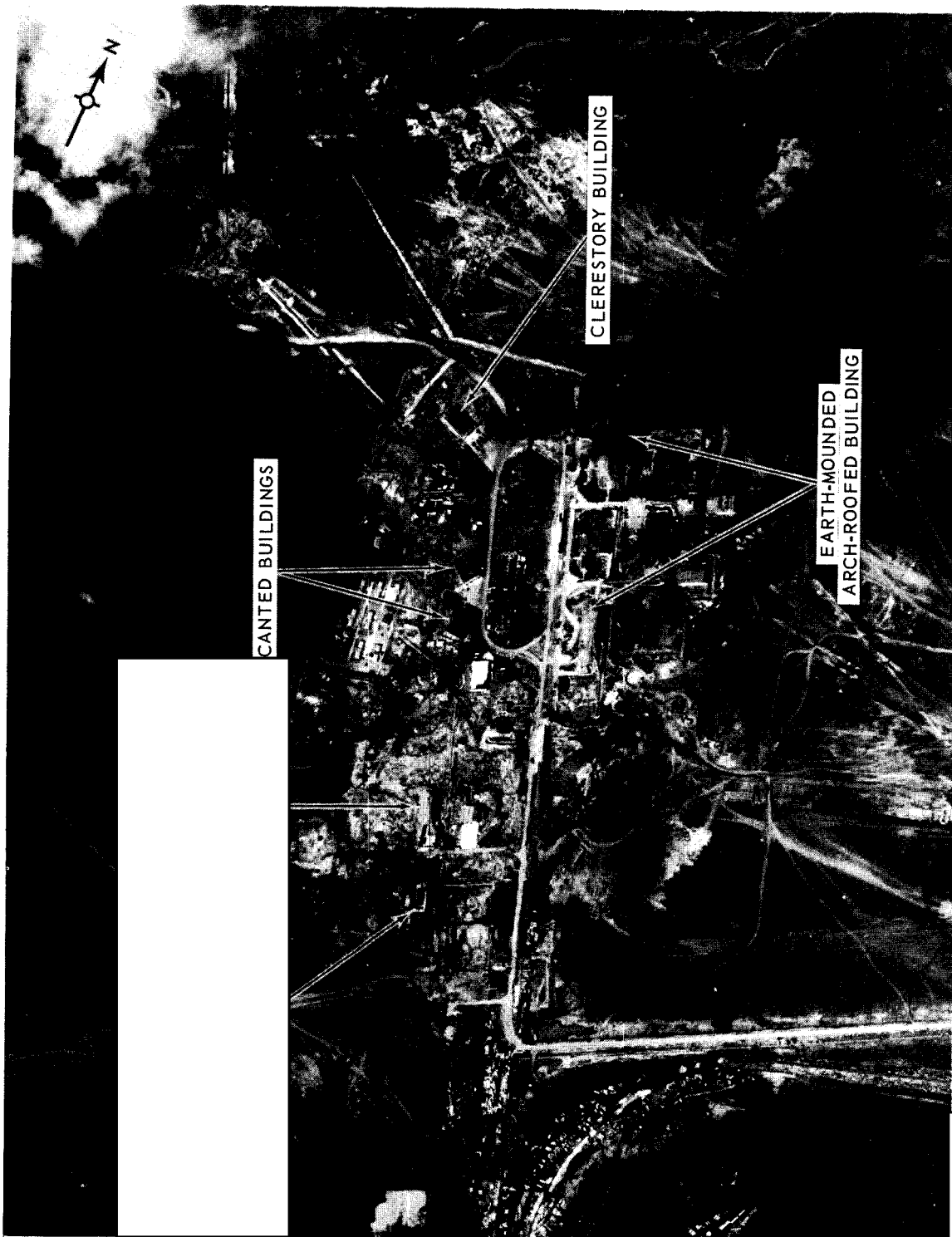


FIGURE 10, RAIL-TO-ROAD TRANSFER POINT SERVING TYPE IIIC SITES.

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wide variation in the number of sites, ranging from a low of 29 at Gladkaya to a high of 87 at Tatishchevo. Drovyannaya has 38 sites, Olovyannaya 74, and Perm 36. As might be expected, deployment identified at the 4 additional complexes is still very limited, ranging from a low of 4 at Kostroma to a high of 22 at Svobodnyy.

In addition to the disparity in numbers, there apparently is a difference in the deployment pattern observed at Tatishchevo and Olovyannaya and that observed at all other Type IIID complexes. This difference is highlighted by the identification of an L-shaped electronic facility associated with Type IIID deployment at Tatishchevo and Olovyannaya and the lack of such a facility at all other Type IIID complexes, even though they contain sites which are now operational. It is not possible at this time to say whether this indicates different guidance systems, or a different targeting philosophy (i.e., area versus pinpoint). We do not know the true function of the electronic facility.

We have been able, in many instances, to align the launchers at deployed complexes into groups of 10; however, in some cases, it has not been possible to determine with confidence which 10 sites constitute a given group. We still believe that the Type IIID sites will be deployed in operational groups of 10, each group having a control facility which is connected to the sites by an extensive network of cabling.

We have identified 37 launch groups at the 9 complexes currently associated with Type IIID site deployment. Determination of the number of groups is based on the identification of a control facility, and the geographical layout of identified sites and their association with the control facility. We have no evidence at this time to indicate that the launch groups within a complex will be interconnected, which would provide maximum flexibility in the event that 1

control center was rendered inoperative. The following table displays site deployment by complex and associated control and electronic facilities:

Complex	No of Sites	Groups (1 X 10)	Control Facilities	Electronic Facilities
Olovyannaya	74	8	9	5
Tatishchevo	87	10	10	4
Drovyannaya	38	4	4	0
Gladkaya	29	3	3	0
Kostroma	4	1	0	0
Kozelsk	18	2	2	0
Perm	36	4	4	0
Svobodnyy	22	3	3	0
Yedrovo	10	2	1	1
	318*	37	36	10

*Does not include 29 sites in possible category.

At the Olovyannaya Complex, where we have identified 74 confirmed and probable sites, there are 8 groups or parts of groups of Type IIID silos. To date, we have discovered 9 control facilities but only 5 of the associated electronic facilities. One of these control facilities and 1 electronic facility are located at a unique site adjacent to the transfer point, and are discussed later in this report. We anticipate that the Soviets will add the electronic facility to the other control sites, and that the Olovyannaya Complex eventually will contain a minimum of 80 Type IIID single silos. The same situation exists at the Tatishchevo Complex where there are 87 sites, 10 control facilities, and 4 electronic facilities. We expect this complex to have at least 100 sites. As indicated in the table, the control facilities identified at the other complexes are consistent with the number of identified sites to form a 1 by 10 deployment pattern.

CONTROL

In the observed 1 by 10 deployment pattern, we believe that 1 control facility and an associated electronic facility (at the complexes where they exist) will be responsible for the operational control of 10 single-silo sites. There is evidence of extensive cabling connecting the

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control facilities and the silos, not only at Launch Group L at Tyuratam but also at the deployed complexes. At this time, we are unable to assess whether or not missiles can be launched from individual silos if all 10 sites within a group are not complete.

Three complexes, Olovyannaya, Tatishchevo, and Drovyanaya each have 1 Type IIID silo that cannot be associated with any existing launch group. In each case this site is located in or near the rail-to-road transfer point. These sites are considered to be unique because of their location, facilities, and lack of association with any given group of 10 Type IIID sites.

Launch Site 24 at Olovyannaya is located approximately 1,500 feet northwest of the rail-to-road transfer point, with access to the complex main road which connects it with the transfer point (Figure 11). The site is in the midstage of construction, with an L-shaped electronic facility being installed. It is triple-fenced and also contains the [redacted]

[redacted] and 4 large drive-in buildings, the smallest of which probably functions as a vehicle/equipment maintenance shop for the [redacted]

Several other smaller buildings are also in the vicinity of the site. Orientation of the [redacted]

of the L-shaped electronic facility is identical to that at Launch Site 17 approximately 6.5 nm to the northeast. The 2 control buildings at Launch Site 24 are 110 by 55 feet and 75 by 55 feet, respectively, whereas the control buildings at Launch Site 17 and other control sites are 50 by 25 feet and 45 by 45 feet, respectively. Cable scars to Launch Site 24 from the other launch sites and control facilities in the complex are not discernible. This does not preclude continuity of the cable and access road networks, or the fact that cable emplacement may not be visible.

Launch Site 35 at Tatishchevo, located adjacent to the northeast side of the rail-to-road

transfer point, is in the midstage of construction (Figure 12). Approximately 400 feet southeast of the launch silo, the construction of a possible control building is in progress. No L-shaped electronic facility is identifiable to date; however, the area within the site security fence extends eastward sufficiently to include one.

[redacted] Access to the launch site is directly from the main road in the transfer point. As with Launch Site 24 at Olovyannaya, no discernible cable scars connecting with other launch sites and group control facilities within the complex are in evidence.

Launch Site 41 at Drovyanaya, located at the southeast edge of the rail-to-road transfer point, is in the midstage of construction (Figure 13). Contained within the triple-fenced site are the silo, grading of the silo access, and a probable arch-roofed building under construction. No L-shaped electronic facility, or provision for such, is evident. As at Olovyannaya and Tatishchevo, no association of Launch Site 41 with any group in the complex can be determined. Access to the site is directly from the transfer point. [redacted]

In summary, the comparative evidence is as follows:

1. These unique sites are all similarly located within their respective complexes.

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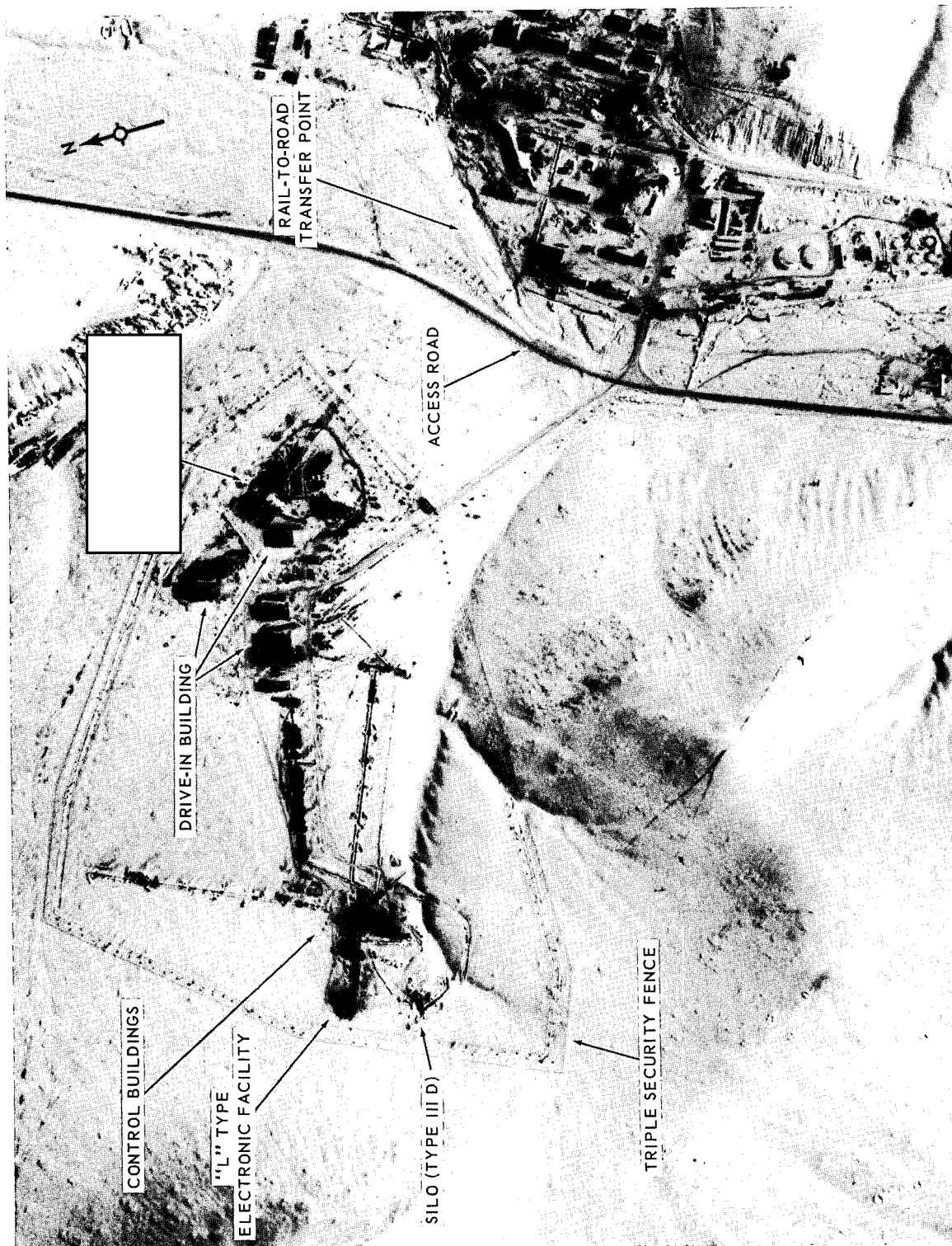


FIGURE 11. LAUNCH SITE 24, OLOVANNAYA ICBM COMPLEX.

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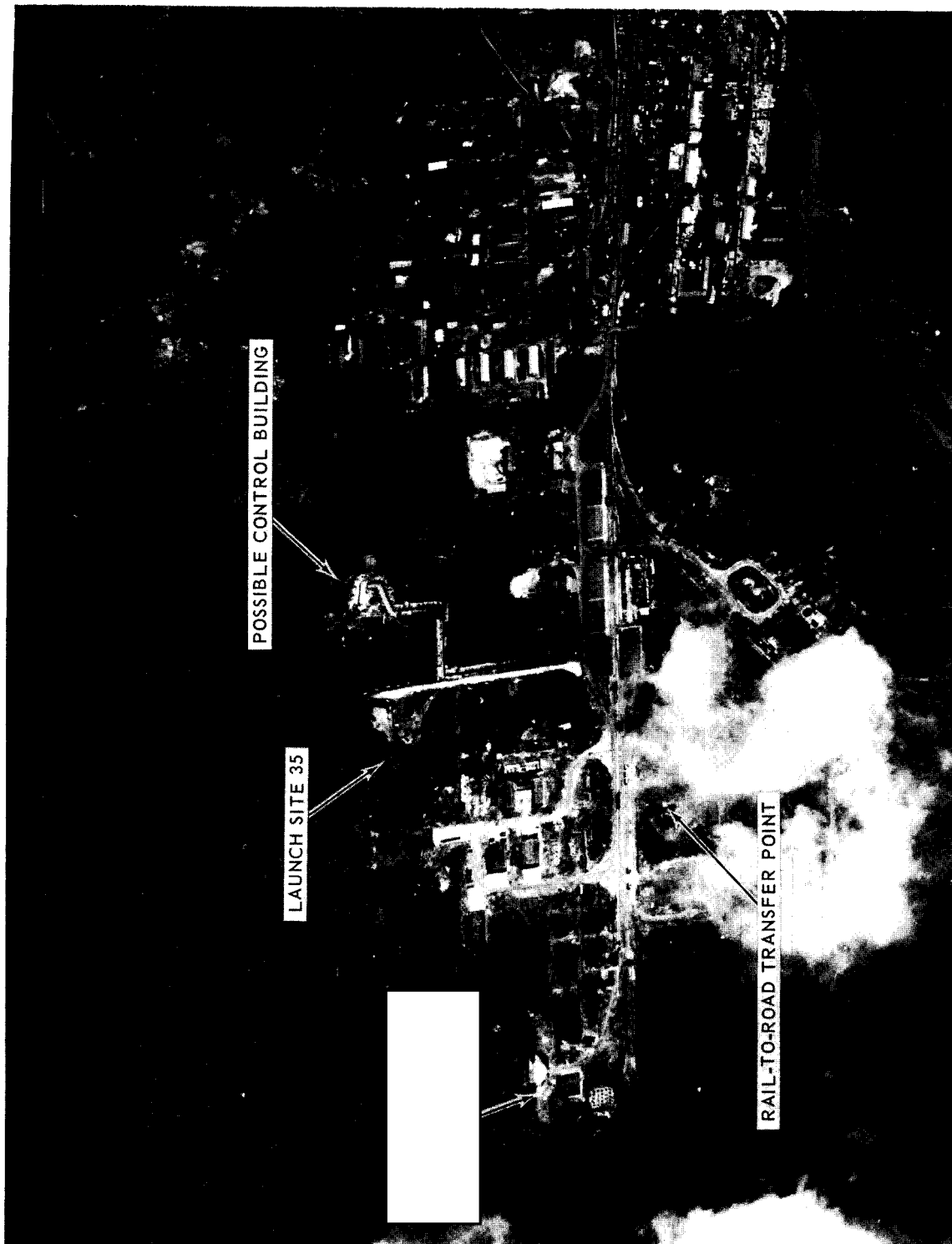


FIGURE 12. LAUNCH SITE 35, TATISHEVO ICBM COMPLEX.

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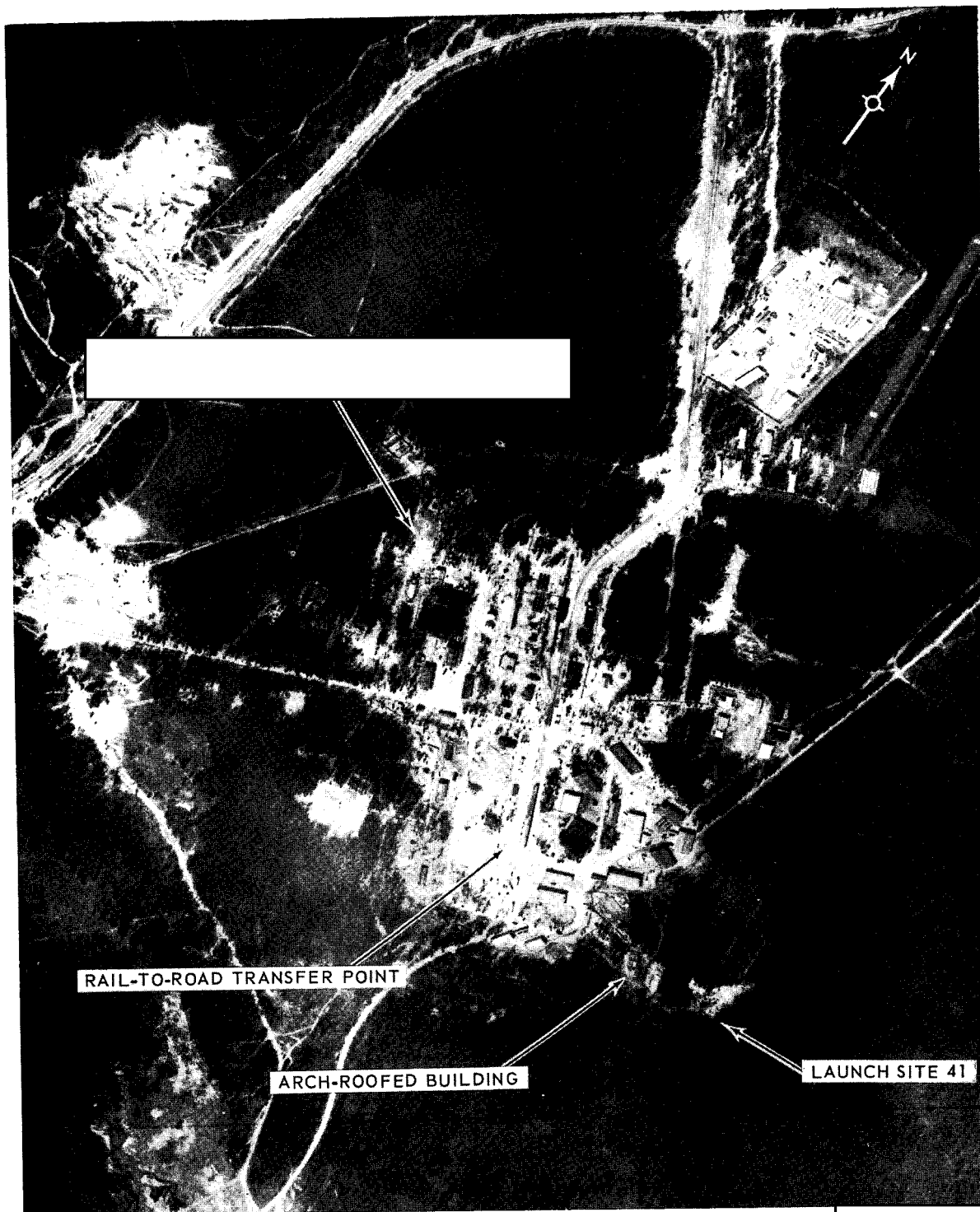


FIGURE 13. LAUNCH SITE 41, DROVYANAYA ICBM COMPLEX.

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than any individual site. At Olovyannaya, terrain features necessitated the location of these facilities near Launch Site 24.

3. Evidence to date does not indicate, or is not discernible, for an affiliation of these sites near the transfer points with any particular group of sites. Also, there is no indication as to the function or affiliation they will have with regard to the complexes. The central location of these sites at the transfer point supports the possibility that, in addition to being launch sites, they may also be complex control facilities. The control buildings at Launch Site 24 at Olovyannaya have approximately twice the floor space as the individual group control sites.

4. The 3 sites are all in the midstage of construction, but the construction time span is not the same as for the sites in the adjacent groups in each complex. Construction methods appear to be the same as those used at other type IIID sites.

SITE COMPOSITION AND CONSTRUCTION TIMING

Individual launch sites, other than that containing the control facility, are simple and austere consisting of a silo structure with an inner diameter of about [redacted] a 5-sided silo door, a generally T-shaped access road pattern, and 1 small building located near the silo. We still have been unable to identify any fueling or equipment facilities in the vicinity of the launch sites.

Coring for the silo is accomplished after the digging of a small irregular excavation. The silo is then constructed in the excavation. During this time, the small building is constructed near the silo and grading for the level access is accomplished. Due to the small size of these sites, details of the con-

struction activity in the silo coring are not discernible until the silo has been constructed up to the floor of the excavation. Because of this, we are unable to determine an accurate point in time or an accurate elapsed time when the site progresses from the early to midstage phase of construction. We believe that the early stage of construction involves a mean time of about 4 to 5 months (Figure 14).

Silo construction is brought to the floor of the excavation and then to surface level. During this period, there is additional activity at the site but the scale of photography and the smallness of the site preclude determination of the nature of this activity. Foundations and footings for the rails which eventually accommodate the silo door are constructed during this period. The excavation around the silo is then backfilled up to the level of the graded access road. The midstage construction (Figure 15) involves about 10 months and a cumulative elapsed mean time of 14 to 15 months.

During the late stage of construction, the access apron is paved and final grading of the access road is accomplished. We believe that the silo door for the Type IIID silo is poured in place and then installed. After a general clean-up of the area, the site is considered to be complete (Figures 16 and 17). Because of the delay observed last year in sites progressing from the late stage to completion, we have altered our estimate of IIID site construction timing to 21 to 24 months for a group of 10 sites to reach an operational status. This judgment was based on 4 launch groups having been under construction for about 14 to 16 months, and only 2 of them having reached the late stage of construction by mid-1965. The 2 launch groups which were in a late stage of construction in mid-1965 (Olov-

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yannaya Launch Group D and Tatishchevo Launch Group A) remained in that configuration until about mid-1966, when some sites were determined to be complete after an elapsed time of about 25 months. Launch Group G at Drovyanaya required about 21 to 22 months from start of construction until the sites were completed.

We are unable to determine from photography why the Type IIID sites take so long to complete. They appear to be a much simpler site than the Type IIIC silo, yet they take as long to construct. Our present assessment is that it takes approximately 24 months to complete a group of 10 Type IIID sites. Allowing 90 days for outfitting the silo, installing the missile, and checkout procedures, approximately 24 to 27 months elapse before the group can be considered operational.

One possible explanation for this apparent lag in construction time could be the availability of missiles for the sites. At the time of the first R&D firing of the SS-11 in [] about 100 Type IIID silos had been started and were in various stages of construction, deployment having started in [] By the time of initial operational capability of the SS-11 in early 1966, there were over 200 deployed sites under construction. It is possible that the SS-11 went into series production in late 1965, and that the Soviets may have experienced production problems. Whatever the problems encountered, it is obvious from coverage of these sites that the pace of construction is slower than we had previously estimated. We continue to believe that the Soviets could complete these sites in a much shorter time should they desire to do so.

Of significance in the Type IIID site deployment is a recently observed apparent reduction in construction time between early and mid-stage. This is probably due to improved techniques in silo coring and construction of the

silo. For example, at the Svobodnyy Complex, where Type IIID deployment started in 1966, several sites negated in [] were first noted on photography in [] in the midstage of construction. The experience gained in silo construction at the original IIID complexes could result in a shorter construction time for Type IIID sites at the 4 complexes where deployment was started in [] However, the significant time lag at the original complexes occurred during the mid and late phases of construction, and it is too early in the deployment of Type IIID sites at the complexes identified in [] to ascertain if similar time lags also will occur.

PACE AND EXTENT

Construction starts for the Type IIID silos followed a fairly consistent pace from the start of deployment up to late 1965, averaging 8 to 9 starts per month. The detection of construction starts subsequent to our last overall evaluation reveals that the estimated decline in this program during 1965 was temporary in nature and had no significant impact on the overall program.

In early 1966, there was a sharp increase in the number of Type IIID sites detected, and also the extension of deployment to 4 additional complexes. Analysis of this large number of newly identified sites revealed that significant numbers of them were, in fact, 1965 construction starts. It was, therefore, late in 1965 when there was a noticeable increase in the pace of Type IIID single-silo construction starts.

Our current estimate of the Type IIID construction start pace is about 20 starts per month. We are unable to determine, at this time, whether this increased pace represents a long-term trend or is only temporary in nature.

SUPPORT FACILITIES

The complex support facility, rail-to-road transfer point, and []

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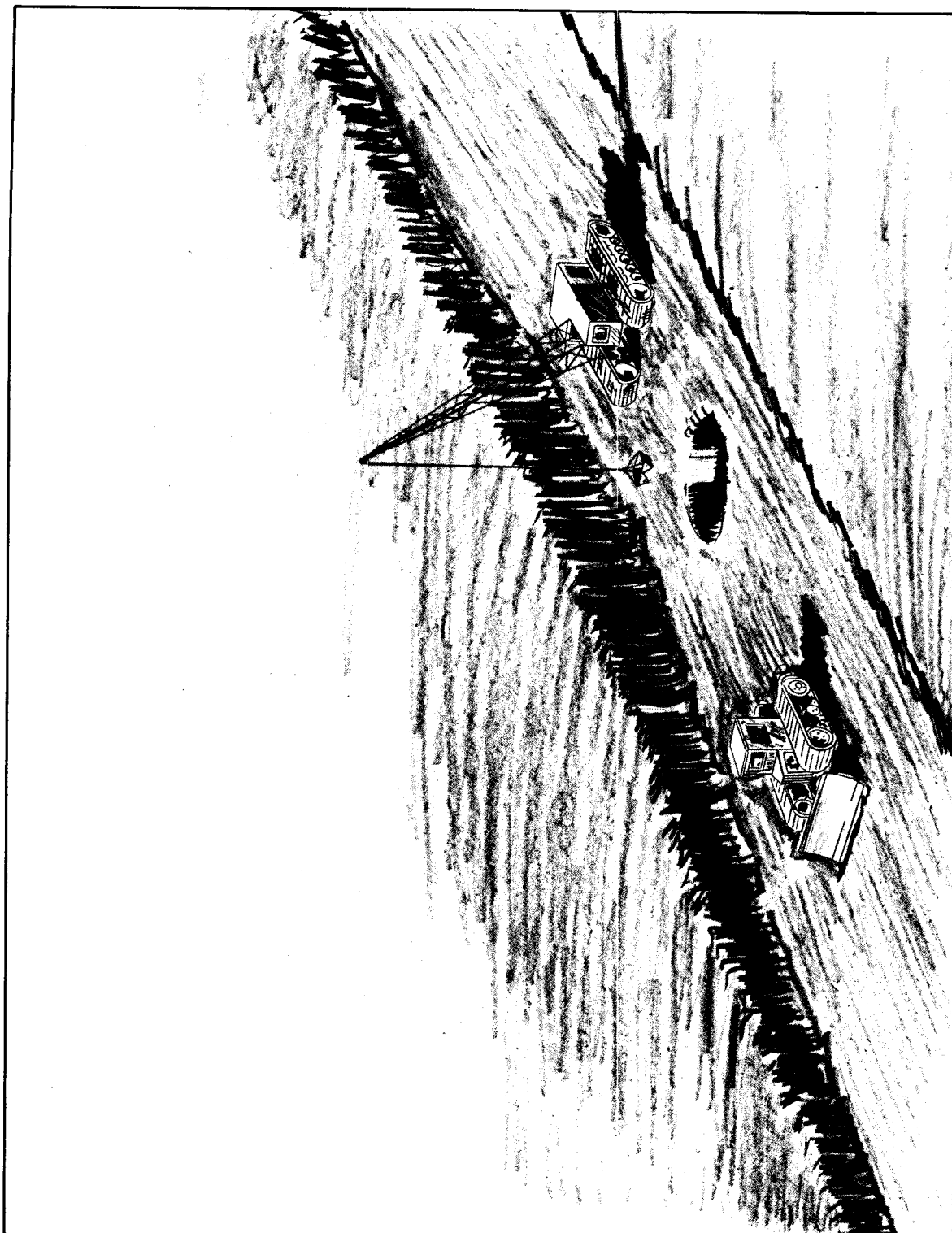


FIGURE 14. ARTIST'S CONCEPT OF TYPE IIID SITE IN EARLY STAGE OF CONSTRUCTION.

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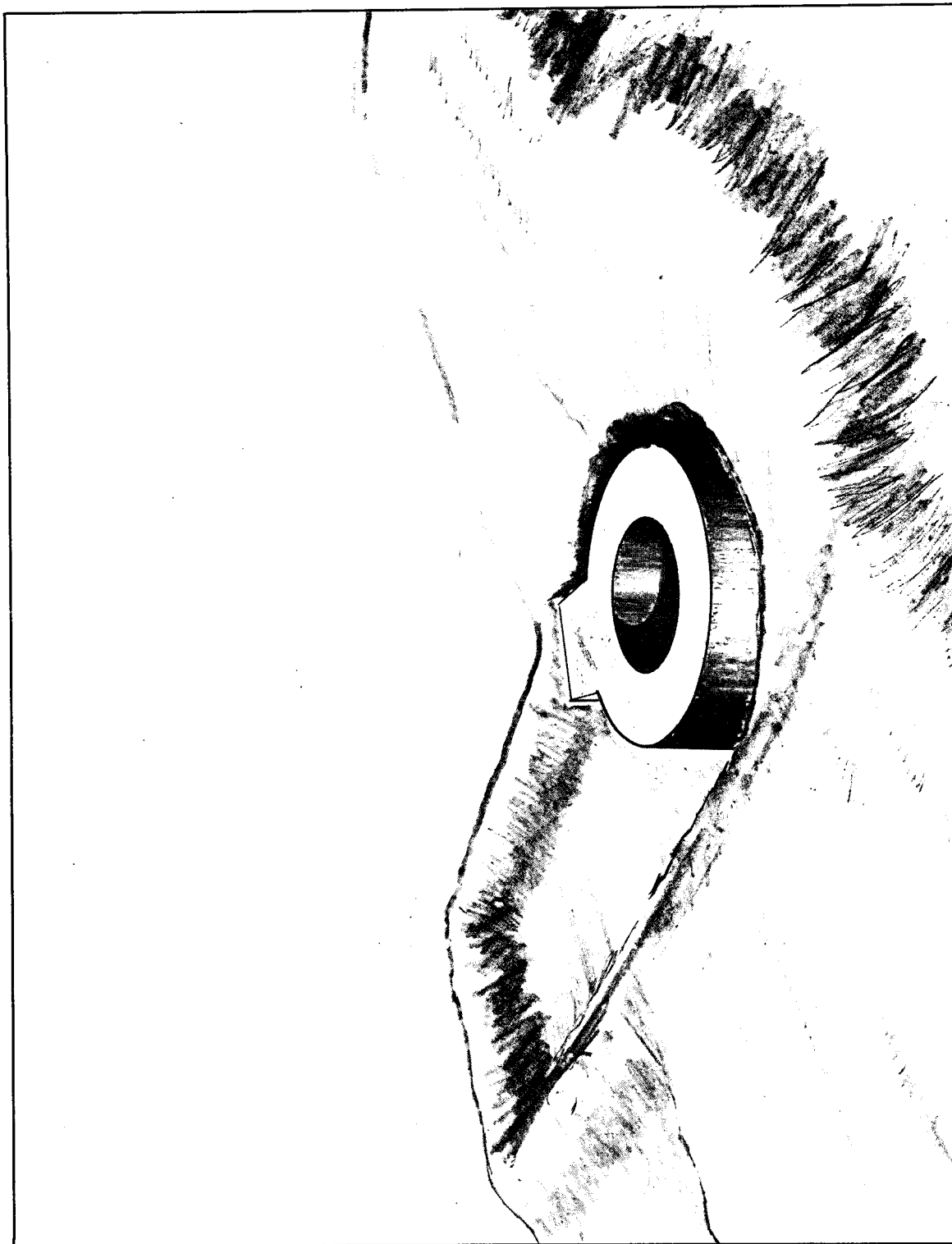


FIGURE 15. ARTIST'S CONCEPT OF TYPE IIID SITE IN MIDSTAGE OF CONSTRUCTION.

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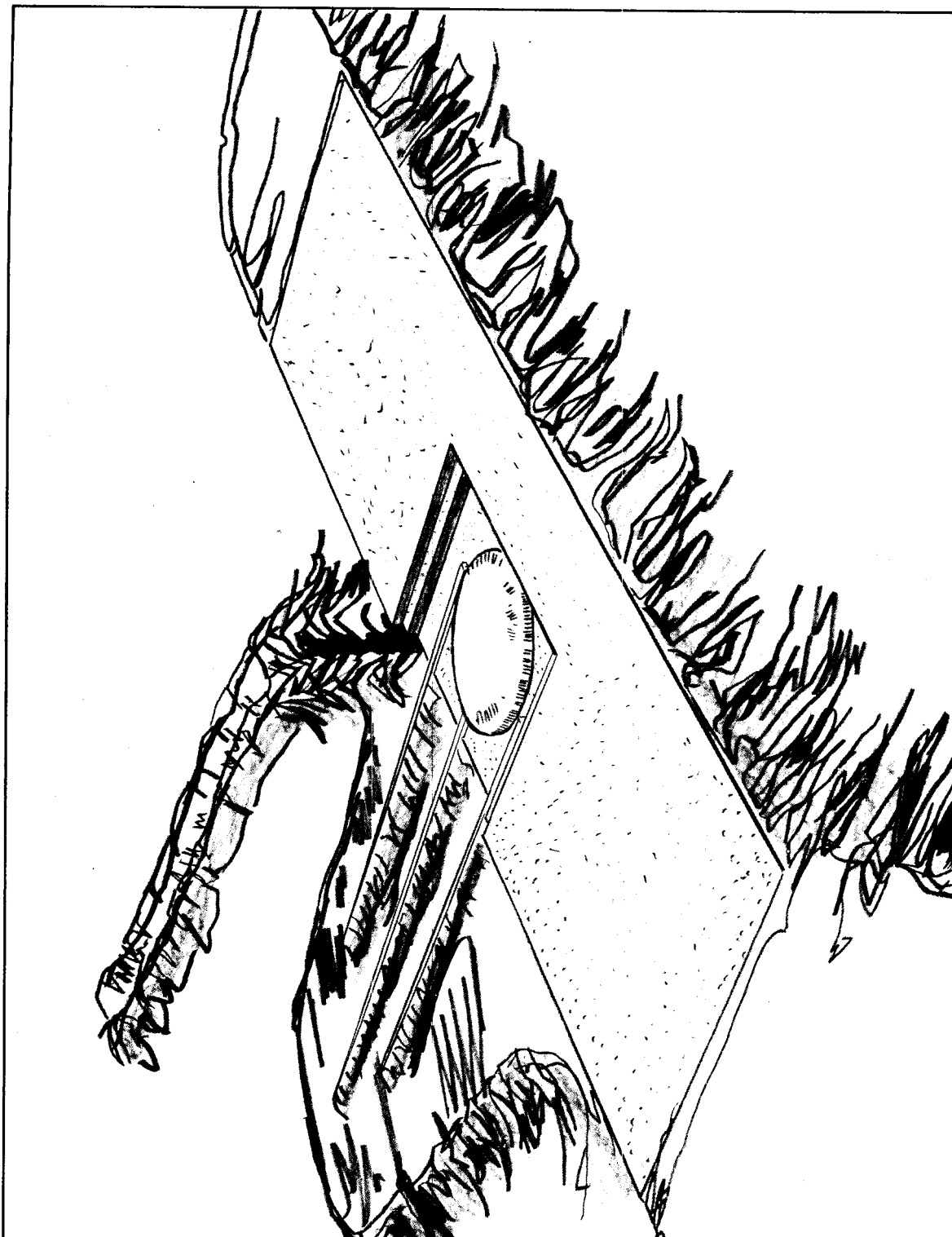


FIGURE 16. ARTIST'S CONCEPT OF TYPE IIID SITE IN LATE STAGE OF CONSTRUCTION.

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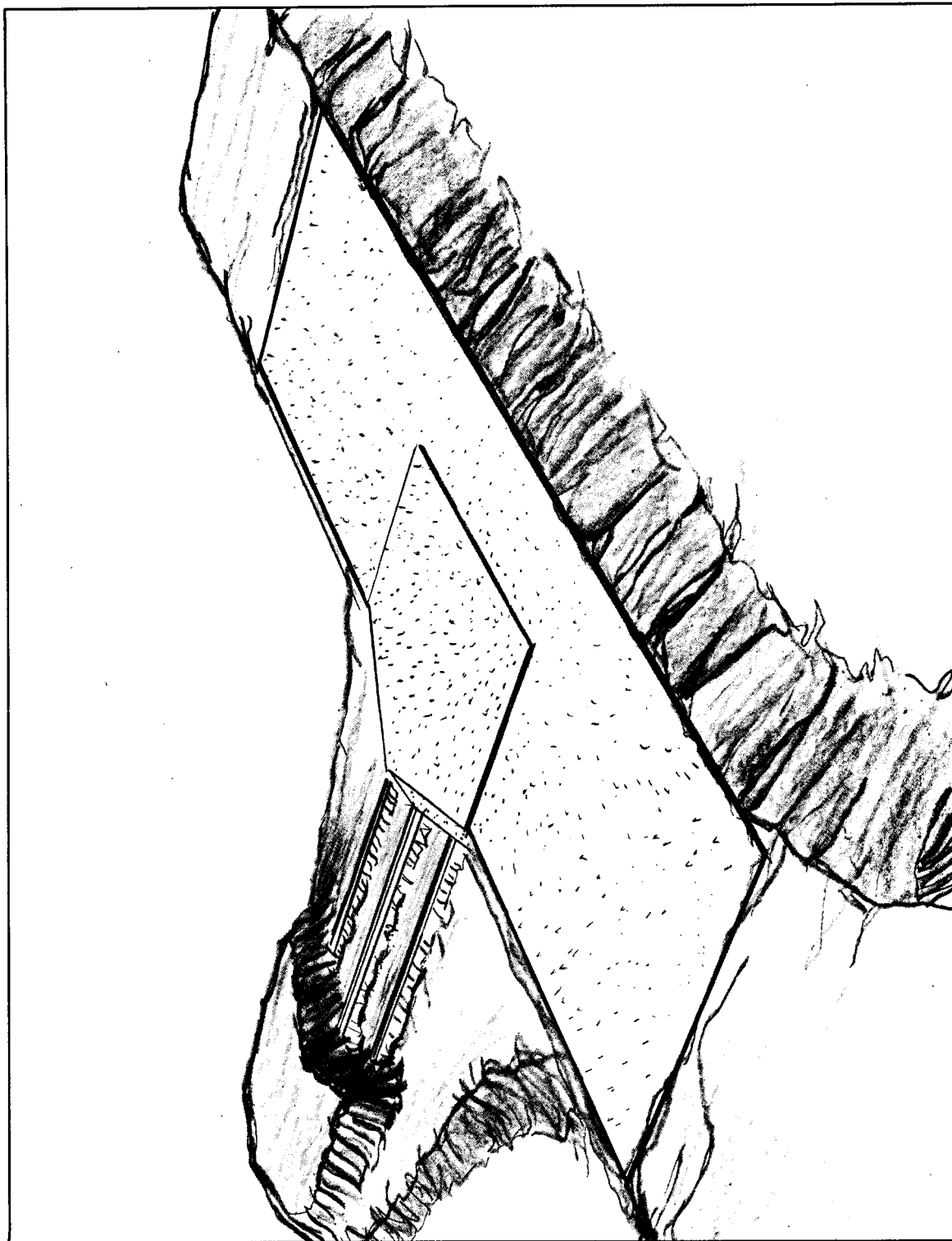


FIGURE 17. ARTIST'S CONCEPT OF COMPLETED TYPE IIID SITE.

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[] at the Tatishchevo, Drovyannaya, Olovyannaya, Perm, Gladkaya, Svobodnyy, Yedrovo, Kozelsk, and Kostroma ICBM complexes (composed either totally or partially of Type IIID single-silo launch sites) have been reviewed. It was found that all the complexes where Type IIID launch sites are deployed have the same basic support facilities.

The complex support facility at each of these complexes appears to be basically the same (Figure 18). The size of the facility in relation to the overall size of the ICBM complex does not correlate. For example, the Tatishchevo and Olovyannaya complexes have more Type IIID sites than the other complexes, yet the complex support facilities are the smallest in area and rail facilities. Generally, there are from 2 to 6 rail spurs serving each of the railhead and storage areas. Most of the area is used for open storage. Several single-story warehouse-type buildings are located near the rail spurs; a batch plant, various miscellaneous storage and maintenance buildings, and usually 1 or 2 overhead cranes are associated with the railhead and storage areas.

The rail-to-road transfer point at each ICBM complex contains generally the same types of buildings, although locations will vary. Also, the same types of buildings present at the transfer point of one complex may be under construction at the transfer point of another complex. Each transfer point probably has 4 areas of inter-related activity: (1) a missile assembly and maintenance area; (2) a vehicle maintenance and storage area; []

[] and (4) an area containing 2 earth-covered arch-roofed buildings with probable water treatment basins (Figure 12). In some instances, there are 2 additional arch-roofed buildings located across the road behind the earth-covered buildings; usually they are parallel, but not in all cases. These build-

ings probably will be earth covered. Also, if the 2 additional arch-roofed buildings are present, there usually are 4 probable water treatment basins. However, Olovyannaya has 4 water treatment basins but only 2 arch-roofed earth-covered buildings are present at this time. The specific relationship between the arch-roofed buildings and the water treatment basins has not been determined.

Usually, there are earth-covered tanks either at or near the transfer point. These tank groupings usually consist of 2 or 3 large circular tanks and 6 smaller circular tanks. It is feasible that the larger tanks could be used to meet the requirements of the steam-plant and other operational functions of the transfer point; there have been no indications of their use in supplying fuel for the missiles. The 6 smaller tanks have an undetermined purpose. The Drovyannaya transfer point has 2 revetted aboveground circular tanks and 6 horizontal cylindrical tanks.

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FIGURE 18. COMPLEX SUPPORT FACILITY SERVING TYPE IIID SITES.

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[redacted]

and modifications have taken place at other old sites. All these facts suggest that the role of Plesetsk is expanding in the overall missile program.

Plesetsk has more than just a normal operational ICBM complex since its inception. It was the first deployed ICBM complex, and activity was evident there as early as [redacted] and [redacted]. As the overall missile deployment program began to unfold in [redacted] it was determined that Plesetsk was the only deployed location for the SS-6 ICBM, with 4 launchers which were apparently replicas of Launch Area B1 at Tyuratam.

[redacted]

With regard to the 9 complexes, in no case were the earth-covered arch-roofed buildings observed without the probable water treatment basins also being present. Neither the earth-covered buildings nor the probable water treatment basins were present at the transfer points at Kostroma, Kozelsk, Svobodnyy, or Yedrovo. However, these are the most recent complexes where Type IIID sites have been deployed, and it may be too early for this expansion of the transfer points to have taken place. There is some unidentified activity at the Yedrovo rail-to-road transfer point. The location of the activity is similar to the positions of the earth-covered arch-roofed buildings at the other transfer points; however, it is too early to determine the nature of the construction.

PLESETSK COMPLEX

There have been several significant occurrences involving the Plesetsk ICBM complex since our last revision. These included the launching of 7 ICBMs and 4 space vehicles (1 a failure); the construction of an instrumentation site near Launch Site 3; construction of the so-called "bow and arrow" tracking and/or guidance facility; and the introduction of new possible launchers at the Plesetsk Complex. Construction also has continued at the unique soft sites at Plesetsk Launch Sites 9 and 10,

[redacted] an SS-6 ICBM was launched to Kamchatka -- the first known instance of an ICBM firing from any location other than the Tyuratam rangehead. Since that time, there have been a total of 8 ICBM firings from Plesetsk.

A facility resembling a soft MRBM/IRBM site was observed under construction in [redacted]. The purpose of this site, which is oriented toward Sary Shagan, has not been determined.

[redacted] with the identification of construction of Launch Sites 9 and 10, there were indications of the expansion of the overall role of Plesetsk. These sites, which have no prototypes at Tyuratam or comparative facilities elsewhere, will consist of 4 rail- and gantry-served soft pads, apparently to handle a large missile system. The size of the gantries -- 150 feet high, with a base approximately 100 feet long riding on tracks with a gage of 40 to 45

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feet -- is indicative of the large size of the system. Only the gantries at Tyuratam Launch Areas G3-G4 are larger than these at Plesetsk. These sites should be completed by mid-1967.

An expansion also took place at one of the Type IA sites during [] and has continued into []. This activity consisted of the construction of large missile-checkout buildings, the expansion of existing electronic facilities, and modifications to the launcher. It is possible that this is the facility used in the launches of the Cosmos reconnaissance satellites from Plesetsk during [].

There is the possibility that a group of new-type launchers or electronic facilities is under construction at Plesetsk. If they are launchers, they would represent yet another site type at Plesetsk without a prototype at Tyuratam, and support a possible R&D role

for the complex. If they prove to be electronic facilities, they could be in support of a military space role.

The "bow and arrow" electronic facility under construction at Plesetsk since the latter half of [] is almost identical to 2 such facilities located at Tyuratam and Kapustin Yar.

Based upon the observed expansion of facilities at Plesetsk, the introduction of new facilities, and the continued ICBM and Cosmos launch activity from Plesetsk, we believe that:

1. Plesetsk is primarily an operational ICBM complex and also has an active training role.
2. Plesetsk has now assumed a role in the Soviet military space program.
3. Plesetsk may eventually have an R&D function.

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25X1

TABLE 1. SUMMARY OF ESTIMATED STATUS OF IDENTIFIED ICBM, IRBM, AND MRBM LAUNCHERS AT DEPLOYED COMPLEXES, 25X1

Type	Sites	Launchers	Operational	U/C	Type	Sites	Launchers	Operational	U/C
ICBM					IRBM				
IA	3	4	4	0	III	13	50	50	0
IB	2	4	0	4	IV	<u>17</u>	<u>51</u>	<u>51</u>	<u>0</u>
IIA	5	10	10	0	TOTALS	30	101	101	0
IIB	29	58	58	0	MRBM				
IIC	7	14	14	0	I	84	336	336	25X1 0
IID	30	60	60	0	II	51	204	204	0
IIIA	23	69	69	0	IV	<u>21</u>	<u>84</u>	<u>84</u>	<u>0</u>
IIIB	3	9	9	0	TOTALS	156	624	624	0
IIIC ₁ /	122	122	33	89	GRAND				
IIID ₂ /	<u>318</u>	<u>318</u>	<u>40</u>	<u>278</u>	TOTALS	188	709	709	0
TOTALS	542	668	297	371					

*Figures include 3 launch silos at Type IIIA and IIIB ICBM and Type IV IRBM sites, and 4 launch silos at Type IV MRBM sites. Type IIIC and IIID ICBM sites contain single silos.

1/Figures do not include 2 sites carried in the possible category.

2/Figures do not include 29 sites carried in the possible category.

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